

# IS-IS · PART 1

Protocol Header									
4			8			12			16
IRPD						Packet Length			
Version/Protocol ID Extension						ID Length			
R	R	R	PDU Type			Version			
Reserved						Maximum Area Addresses			
Type						Length			
Value ...									

NSAP Addressing				
NSAP	Interdomain Part		Domain-Specific Part	
	AFI	IDI	HODSP	System ID
	Area		SEL	
	Example	47	0005.80ff.f800.0000	0001 0000.0c00.1234 00

## Interdomain Part (IDP)

Portion of the address used in routing between autonomous systems; assigned by ISO

## Domain-Specific Part (DSP)

Portion of the address relevant only within the local AS

## Authority and Format Identifier (AFI)

Identifies the authority which dictates the format of the address

## Initial Domain Identifier (IDI)

An organization belonging to the AFI

## High Order DSP (HODSP)

The area within the AS

## System ID

Unique router identifier; 48 bits for Cisco devices (often taken from a MAC address)

## NSAP Selector (SEL)

Identifies a network layer service; always 0x00 in a NET address

Network Types		
	Broadcast	Point-to-Point
DIS Elected	Yes	No
Neighbor Discovery	Yes	Yes
Hello/Dead Timers	10/30	10/30

Troubleshooting	
show ip route	show isis spf-log
show ip protocols	debug isis spf-events
show [clns isis] neighbor	debug isis adjacencies-packets
show [clns isis] interface	debug isis spf-statistics
show isis database	debug isis update-packets

Attributes	
Type	Link-State
Algorithm	Dijkstra
Metric	Default (10)
AD	115
Standard	ISO 10589
Protocols	IP, CLNS
Transport	Layer 2
Authentication	Plaintext, MD5

Routing Levels	
Level 0	Used to locate end systems
Level 1	Routing within an area
Level 2	Backbone between areas
Level 3	Inter-AS routing

Terminology	
Type-Length-Value (TLV)	Variable-length modular datasets
Link State PDU (LSP)	Carry TLVs encompassing link state information
Sequence Number Packet (SNP)	Used to request and advertise LSPs; can be complete (CSNP) or partial (PSNP)
Hello Packet	Establishes and maintains neighbor adjacencies
Designated Intermediate System	A pseudonode responsible for emulating point-to-point links across a multi-access segment

Adjacency Requirements	
· Interface MTUs must match	
· Levels must match	
· Areas must match (if level 1)	
· System IDs must be unique	
· Authentication must succeed	

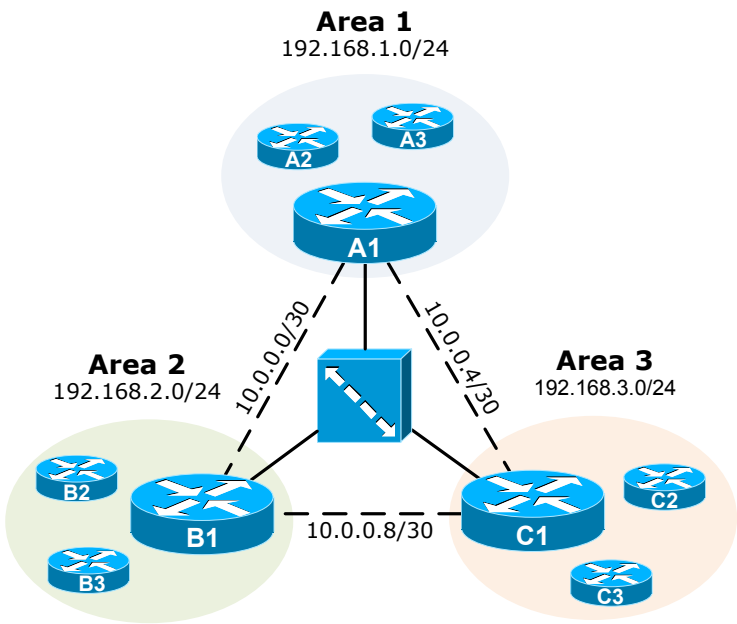
DIS Election	
· Highest-priority interface elected	
· Highest SNPA (MAC/DLCI) breaks tie	
· Highest system ID breaks SNPA tie	
· Default interface priority is 64	
· Current DIS may be preempted	

# IS-IS · PART 2

## TLV Types

Name	Use	Name	Use	Name	Use
<b>1</b> Area Addresses	Hello, LSP	<b>6</b> IS Neighbors	Hello, L2 LSP	<b>128</b> IP Internal Reach.	LSP
<b>2</b> IS Neighbors	LSP	<b>8</b> Padding	Hello	<b>129</b> Protocols Supported	Hello, LSP
<b>3</b> ES Neighbors	L1 LSP	<b>9</b> LSP Entries	SNP	<b>131</b> IDRPI	SNP, L2 LSP
<b>5</b> Prefix Neighbors	L2 LSP	<b>10</b> Authentication	All	<b>132</b> IP Interface Address	Hello, LSP

## Configuration Example



Router A2

```
interface FastEthernet0/0
description Area 1
ip address 192.168.1.2 255.255.255.0
ip router isis
isis circuit-type level-1
!
router isis
net 49.0001.0000.0000.00a2.00
```

Router B2

```
interface FastEthernet0/0
description Area 2
ip address 192.168.2.2 255.255.255.0
ip router isis
isis circuit-type level-1
!
router isis
net 49.0002.0000.0000.00b2.00
```

Router A1

```
interface FastEthernet0/0
description Area 1
ip address 192.168.1.1 255.255.255.0
ip router isis
isis circuit-type level-1
!
interface Serial1/0
no ip address
encapsulation frame-relay
!
interface Serial1/0.1 point-to-point
description To Area 2
ip address 10.0.0.1 255.255.255.252
ip router isis
isis circuit-type level-2-only
! MD5 authentication (keychain not shown)
isis authentication mode md5
isis authentication key-chain <keychain>
frame-relay interface-dlci 101
!
interface Serial1/0.2 point-to-point
description To Area 3
ip address 10.0.0.5 255.255.255.252
ip router isis
isis circuit-type level-2-only
frame-relay interface-dlci 102
!
router isis
net 49.0001.0000.0000.00a1.00
```

Router B1

```
interface FastEthernet0/0
description Area 2
ip address 192.168.2.1 255.255.255.0
ip router isis
isis circuit-type level-1
!
interface Serial1/0
no ip address
encapsulation frame-relay
!
interface Serial1/0.1 point-to-point
description To Area 1
ip address 10.0.0.2 255.255.255.252
ip router isis
isis circuit-type level-2-only
! MD5 authentication (keychain not shown)
isis authentication mode md5
isis authentication key-chain <keychain>
frame-relay interface-dlci 101
!
interface Serial1/0.2 point-to-point
description To Area 3
ip address 10.0.0.9 255.255.255.252
ip router isis
isis circuit-type level-2-only
frame-relay interface-dlci 103
!
router isis
net 49.0002.0000.0000.00b1.00
```